

DOCUMENT RESUME

ED 077 597

PS 006 586

AUTHOR Hamilton, Marshall L.
TITLE Imitative Behavior and Expressive Ability in Facial Expression of Emotion.
INSTITUTION Washington State Univ., Pullman. Dept. of Child and Family Studies.
PUB DATE Apr 72
NOTE 14p.; Paper presented at the Annual Convention of the Western Psychological Association (Portland, Oregon, April 26-29, 1972)
EDRS PRICE MF-\$0.65 HC Not Available from EDRS.
DESCRIPTORS *Emotional Response; Grade 2; Grade 5; Identification (Psychological); *Imitation; *Nonverbal Ability; Observation; Preschool Children; Technical Reports

ABSTRACT

Vicarious influence on emotional response has been demonstrated in several studies, but the identity between the response of the model and that of the observer has received little attention. Seventy-two children from three grade levels were tested for their ability to recognize and form facial expressions of emotion. The subjects then observed a model portray happy or sad facial expressions in two films, while raters observed the subject's facial responses. The children imitated the facial expressions of the model at a significant level. Both ability to recognize and ability to form expressions improved with the child's grade level. Ability to form expressions was significantly related to the subject's level of imitation of the model's expressions. [Not available in hard copy due to marginal legibility of original document.] (Author)

W.P.A., APRIL, 1972

U. S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE
PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS
STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION
POSITION OR POLICY.

IMITATIVE BEHAVIOR AND EXPRESSIVE ABILITY IN
FACIAL EXPRESSION OF EMOTION

Marshall L. Hamilton

Washington State University

Vicarious influence on emotional response has been demonstrated in several studies, but the identity between the response of the model and that of the observer has received little attention. 72 children from three grade levels were tested for their ability to recognize and form facial expressions of emotion. The subjects then observed a model portray happy or sad facial expressions in two films, while raters observed the subject's facial responses. The children imitated the facial expressions of the model at a significant level. Both ability to recognize and ability to form expressions improved with the child's grade level. Ability to form expressions was significantly related to the subject's level of imitation of the model's expressions.

ED 077597

PS 006586

ED 077597

PS 006586

IMITATIVE BEHAVIOR AND EXPRESSIVE ABILITY IN
FACIAL EXPRESSION OF EMOTION¹

Marshall L. Hamilton²

Washington State University

Several lines of current research focus on vicarious influences on emotional response. A number of investigators have demonstrated vicarious conditioning of heart rate and/or skin resistance responses in subjects by using electric shock to a model as the unconditioned stimulus (e.g., Berger, 1962; Bandura & Rosenthal, 1966; Craig & Lowery, 1969). Schachter and Singer (1962) found certain physiologically aroused subjects could be influenced in their behavior and self-description to be angry or euphoric, depending on which of these emotions was portrayed by an accomplice who was with the subject. Bandura and his associates have demonstrated that child or adult subjects fearful of animals respond with reduced fear after observing models interacting with similar animals in a nonfearful fashion (Bandura & Menlove, 1968; Bandura, Blanchard, & Ritter, 1969).

While these studies demonstrate the influence of the model's emotional behavior on the emotional behavior of the observer, there has been less focus on demonstrating identity between the emotions of the model and the observer. Craig and Lowery (1969) dealt with the question of identical responses in the model and the observer in their study of vicarious conditioning. They found that the observer's galvanic skin response was in the same direction as the response which occurs when a subject

experiences electric shock directly. However, heart rate deceleration occurred in the observers, while heart rate acceleration occurs when direct aversive stimulation is experienced.

Berger (1968) notes that two definitions of vicarious phenomena in imitative learning are in use, a "descriptive" usage without specification of the underlying process, and an "explanatory" usage which assumes that the observer "shares" the experience of the model. He notes that if an explanatory definition of vicarious reinforcement effects in learning is to be adopted, it must be shown that the effectiveness of reinforcement to the model depends upon the observer perceiving and sharing the model's expressive reaction to reinforcement.

Facial expressions of emotion offer a readily observed expressive response that may be imitated by an observer, and one that is often used as the primary indicator of specific emotional states. Demonstration of imitative behavior in facial expression of emotion would seem to illustrate the perceiving and sharing of a model's expressive reaction that is assumed in an explanatory view of vicarious reinforcement effects.

Hamilton (1972) presented to preschool children a series of slides of a model posing facial expressions of emotion. As the child observed each slide, raters behind a one-way mirror judged the child's facial reaction. Many of the children were found to imitate the posed expressions at levels far beyond chance. There were, however, wide individual differences in the responsiveness of the children, with about half of the children failing to imitate the expressions. The present study is similar in focus. Movies are used in place of slides in order to raise the level of imitative behavior through use of a somewhat more realistic stimulus. In

addition age, sex, ability to recognize expressions, and ability to form expressions are utilized as variables possibly related to individual differences in the tendency to imitate expressions.

Method

Subjects

The subjects were 12 males and 12 females from each of the nursery school, second, and fifth grade levels. The average ages for the three levels were 4 yrs.-8 mos., 8 yrs., and 10 yrs.-9 mos. The children were predominantly from white, middle to upper-middle socioeconomic status families in a university town of 22,000 people. The children were characteristically above average in intelligence. The experimenter was an adult male.

Ability to Recognize Expressions

Eighteen photographs (#7, 20, 16, 17, 32, 39, 24, 9, 21, 2, 13, 8; 40, 12, 31, 37, 15, 28) of models posing facial expressions of emotion were chosen from a set developed by Tomkins and McCarter (1964). The authors found the set to have an average correlation of .858 between the affect posed in a photograph and the affect judged by untrained observers. The 18 photographs selected were formed into three groups of 6 representing the expressions of surprise, fear, anger, disgust, sadness, and happiness. Each child was shown each of the photographs from one group, and was told "this is a picture of someone who feels surprised ('afraid,' etc.)." As the photograph was held upright on a table, the child was asked to point to a picture "that shows someone else who feels surprised ('afraid,' etc.)" in the second group of 6 expressions, and then in the third group, with the second and third groups arranged in two rows on the

table. The child who correctly matched the 6 expressions from each of the second and third groups to those in the "standard" group could obtain a maximum score of 12.

Since this procedure was original, split-half reliability corrected by the Spearman-Brown formula was subsequently determined from the scores the 72 children obtained on the two "test" groups of photographs. The figure obtained was .57.

Ability to Form Expressions

After the child saw the standard photograph for each expression and selected another from each test group to match the standard, he was asked to look toward a mirror and "make a surprised ('afraid,' etc.) face into the mirror." As he made the expression, one or two raters behind a one-way mirror rated the adequacy of the expression on a three point scale.

The raters had studied both Tomkins and McCarter's (1964) and Ekman's (1972) descriptions of the facial components of the six expressions, which are the specific six utilized by Ekman. The raters had also studied the photographs which were shown to the children. A rating of 0 was assigned when there was no similarity between the child's expression and the requested one, 1 when the expression was similar but could as easily be another expression, and 3 when the expression looked most like the intended expression. In subsequent analysis, interrater reliability between raters A and B was $r = .93$ (24df, $p < .01$), and between raters A and C it was $.61$ (10df, $p < .01$).

Films of Expressions

The child observed two two-minute silent films showing the head and upper shoulders of a female drama student, who was seated on a couch

and alternatively speaking and listening in an apparent conversation with someone off camera. The model portrayed happiness in one film and sadness in the other. The intensity of her portrayal varied with the "conversation," so that the effect was that of a series of smiles in the happy film and a series of sad expressions in the sad film, with a more neutral or interested appearance intervening. To control possible content effects in case of lip readers, the model's statements were essentially the same in both films.

As the child watched the films, one or two raters independently tallied sad (-) and happy (+) expressions on the child's face. Rater reliability for raters A and B was $r = .67$ (24df, $p < .01$), and $.49$ (24df, $p < .05$) for the happy and sad films, and it was $r = .56$ (18df, $p < .01$), and $.64$ (18df, $p < .01$) for raters A and C.

Procedure

The subjects were brought to the experimental room individually by the experimenter. The rooms utilized were small, and near the children's class rooms. The experimenter explained, "We are trying to find out how well boys and girls can do at telling how people are feeling just by looking at pictures of people's faces." The child was seated at a table near a back wall of the room. At the front of the room was a wall or screen holding a one-way mirror and a small movie screen. The film projector was located behind the child. The procedures for measuring ability to recognize and form expressions were conducted after the child was seated. Following this the experimenter explained, "Now I want you to watch two silent movies. In one of the movies a lady just found out her dog was hit by a car. In the other movie the same lady is at a party with lots of friends." The child was asked to refrain from commenting until he had

PS 006586

watched both movies, and that he would then be asked to explain which event had occurred in the first movie and which had occurred in the second. The table was then removed, and the child's chair was shifted so that he would not look at himself in the mirror. The experimenter operated the projector, showing the two films in variable orders to different subjects. The raters were unaware of the order of presentation of the films.

Results

The scores obtained for recognition of facial expression are shown in Table 1. A 2 (sex) by 3 (grade level) analysis of variance yielded a significant main effect for grade level ($F = 24.53, p < .001$). This reflects the increase in mean scores from 6.5 at the nursery school level to 10 at the fifth grade level.

The accuracy with which children recognized specific expressions showed the same pattern as the overall score, with each higher grade level having higher recognition scores for each expression. In order of ease of recognition the expressions were happiness, anger, surprise, fear, sadness, and disgust. Nursery school children were 88% accurate in recognizing happy expressions, and this improved to 98% for fifth graders. For disgust, the most difficult expression to recognize, the two figures were 31% for nursery school children and 71% for fifth graders.

Insert Table 1 about here

Comparing the children's scores on the recognition task with their imitative responses to the two films yielded zero order correlations.

The mean scores for expression of emotion are also presented in Table 1. A 2 (sex) by 3 (grade level) analysis of variance of the expression scores yielded a significant main effect for grade level ($F = 6.38$, $p < .025$). This reflects the increase from a mean score of 4.6 for nursery school children to a mean score of 7.0 for fifth graders.

Comparing the children's scores on the expression task with their imitative response to the two films yielded a correlation of $(+).23$ (71df, $p < .10, > .05$) with response to the "happy" film, and a correlation of $(-).28$ (71df, $p < .05$) with sad responses to the sad film. Thus, the expression scores were used to divide subjects into high and low levels of expressive ability for the analysis of imitative responses to the two films.

A preliminary 2 (films) by 2 (order) analysis of variance indicated that there was no significant effect ($F < 1$) of the order of presentation of the films on the child's imitative responses to the films. (A constant was added to the data to eliminate negative numbers resulting from the minus scores for sad expressions.)

The imitative responses to the two films were then subjected to an analysis of variance using grade level (3), level of expressive ability (2), and sex (2) as between variables, and films (2) as a within variable. The analysis yielded a significant main effect for films ($F = 31.42$, $p < .001$), reflecting the mean score of $(+)1.01$ smile responses to the happy film and $(-)1.51$ sad responses to the sad film. A second significant effect resulted from the interaction between films and level of expressive ability ($F = 4.22$, $p < .05$). While children with a high level of expressive ability obtained mean scores of $(+)1.37$ smiles and $(-)2.07$ sad expressions in response to the happy and sad films respectively, the comparable figures for children of low expressive ability were only $(+)0.65$ and $(-)0.94$.

The scores obtained for response to the films may be conservative, since children who held a scorable expression throughout a film, possibly indicating a strong expressive response, were scored as making only one response, in contrast to higher scores for those who made several brief responses.

Imitative behavior occurred at a fairly high rate under the present procedures. In 72% of the cases the direction of the children's facial responses corresponded to those of the model in the two films, while 21% responded in the wrong direction, and 7% responded similarly to both films.

Questioning following the films revealed that all of the children noted in which film the model was happy and in which she was sad. While the second and fifth graders logically linked the model's mood to the rationale about the party and the injured dog, the results for the nursery school children were more variable.

Discussion

The results of the present experiment demonstrate that, under certain conditions, an observer will perceive and imitate the specific emotional expressions of a model. This is one step in exploring the possibility that the underlying process in vicarious learning involves the observer sharing the experience of the model. An additional step would be to demonstrate that a model's expressive reactions following reinforcement, independent of the reinforcement itself, serve as a reinforcement for the observer.

Since the procedures for measuring ability to recognize and form expression had been conducted during the same session as the exposure to

the filmed model, it seemed possible that the initial procedure and/or the instructions could have influenced the child's response to the films. To explore this possibility 15 children from another section of the nursery school were shown the two films. A female experimenter, unfamiliar with the children, brought them individually to the experimental room, and simply asked them to quietly watch the films. Scoring procedures and variation in the order of the films were as before. With this brief procedure the mean imitative response to the happy (+.67) and sad (-.40) films was less differentiated but still reliable ($t = 1.91, p < .05$). Thus, the imitative responses of the main study may have been facilitated by the specific procedure, but the response also occurred on mere exposure to the films.

Of the variables grade, sex, recognition ability, and expressive ability that might have been related to the child's imitative response, only expressive ability was related. For an observer to share a model's expressive response both the ability to recognize and the ability to form expressions are necessary. However, using the measures of the present study, no correlation was found between the child's ability to recognize expressions and his ability to form expressions ($r = .003$). Using different indices Lanzetta and Kleck (1970) found a high negative correlation between the affective expression and the affective perception of their subjects. They reasoned that the individual who has been socialized to inhibit his display of emotion may also have learned to be particularly sensitive to the affect displays of other individuals. Perhaps the correlation between expressive ability and imitation of the model's expressions in the present study reflects both the degree of skill at forming

expressions and the degree of inhibition of expressive responses during the testing and modeling situations. If a vicarious learner is to be influenced by the specific expressive reactions of a model, he obviously must have the ability to recognize the expressions. That it is necessary for the learner to share the overt expressive behavior of the model for vicarious reinforcement to occur seems more questionable.

While the performance at recognizing and forming expressions improved with higher grade levels, it is interesting that the level of imitative response to the films remained relatively constant across grade levels. Observation of the children suggests the speculation that the constancy may result from the interplay of several factors. Nursery school children seemed the least inhibited in their response to the experiment, but their attentiveness and accuracy were more variable. While fifth graders were most attentive and accurate in identifying and forming expressions, they seemed more inhibited and perhaps less likely to react spontaneously to the films. If accurate recognition of expressive behavior by the observer is the main prerequisite for the occurrence of vicarious emotional influences, then the present evidence suggests that the effect of vicarious emotional influences should increase with the age of the child. If it is also necessary that the observer imitate the model's expressive behavior, then it may be that developmental trends in the inhibition of emotional expression may counteract the apparent increase in expressive ability with age.

References

- Bandura, A., Blanchard, E. B., & Ritter, B. Relative efficacy of desensitization and modeling approaches for inducing behavioral, affective, and attitudinal changes. Journal of Personality and Social Psychology, 1969, 13, 173-199.
- Bandura, A., & Menlove, F. L. Factors determining vicarious extinction of avoidance behavior through symbolic modeling. Journal of Personality and Social Psychology, 1968, 8, 99-108.
- Bandura, A., & Rosenthal, T. L. Vicarious classical conditioning as a function of arousal level. Journal of Personality and Social Psychology, 1966, 3, 54-62.
- Berger, S. M. Conditioning through vicarious instigation. Psychological Review, 1962, 69, 450-466.
- Craig, K. D., & Lowery, H. J. Heart-rate components of conditioned vicarious autonomic responses. Journal of Personality and Social Psychology, 1969, 11, 381-387.
- Ekman, P. Universals and cultural differences in facial expressions of emotion. In J. Cole (Ed.), Nebraska symposium on motivation. Lincoln: University of Nebraska Press, 1972 (in press).
- Lanzetta, J. T., & Kleck, R. E. Encoding and decoding of nonverbal affect in humans. Journal of Personality and Social Psychology, 1970, 16, 12-19.
- Schachter, S., & Singer, J. E. Cognitive, social and physiological determinants of emotional state. Psychological Review, 1962, 69, 379-399.

Footnotes

¹This investigation was supported in part by funds provided by the Graduate School Research Funds of Washington State University. The author is indebted to Karen Davis, Sheila McInerney, and Sally Hamilton who served as raters, and to the cooperative personnel of the Washington State University Nursery School and the Edison Elementary School. Helen Szabla acted in the two films.

²Requests for reprints should be sent to Marshall L. Hamilton, Department of Child and Family Studies, Washington State University, Pullman, Washington 99163.

Table 1
Mean Scores for Recognition and Expression of Emotion

Grade Level	Recognition			Expression		
	Males	Females	Both	Males	Females	Both
Nursery School	6.6	6.4	6.5	4.8	4.3	4.6
Second	9.2	8.8	9.0	6.4	6.5	6.4
Fifth	9.4	10.6	10.0	7.2	6.9	7.0